

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

## PCT

### WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/NL2004/000897

International filing date (day/month/year)  
22.12.2004

Priority date (day/month/year)  
22.12.2003

International Patent Classification (IPC) or both national classification and IPC  
H01J37/32, H05H1/24

Applicant  
FUJI PHOTO FILM B.V.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

#### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

2005/04/11 14:44:36 00007

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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/NL2004/000897

**Box No. I Basis of the opinion**

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material:  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing:  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

2005/01/11 14:44:37 00008

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/NL2004/000897

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**Box No. V Reasoned statement under Rule 43b/s.1(a)(I) with regard to novelty, inventive step or  
industrial applicability; citations and explanations supporting such statement**

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**1. Statement**

Novelty (N)	Yes: Claims	1-29
	No: Claims	-
Inventive step (IS)	Yes: Claims	1-29
	No: Claims	-
Industrial applicability (IA)	Yes: Claims	1-29
	No: Claims	-

**2. Citations and explanations**

**see separate sheet**

2005/04/11 14:44:39 00009

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING  
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/NL2004/000897

**Re Item V.**

**1. Reference is made to the following documents:**

- D1 :** ALDEA E ET AL: "GENERATION OF A STABLE ATMOSPHERIC GLOW IN A DBD CONFIGURATION" PROCEEDINGS. INTERNATIONAL SYMPOSIUM ON PLASMA CHEMISTRY, XX, XX, 22 June 2003 (2003-06-22), pages 1-6, XP009034055
- D2 :** BLETZINGER P ET AL: "The effect of displacement current on fast-pulsed dielectric barrier discharges" JOURNAL OF PHYSICS D (APPLIED PHYSICS) IOP PUBLISHING UK, vol. 36, no. 13, 18 June 2003 (2003-06-18), pages 1550-1552, XP002310826 ISSN: 0022-3727
- D3 :** US 5 414 324 A (ROTH ET AL) 9 May 1995 (1995-05-09)
- D4 :** YOKOYAMA T ET AL: "The mechanism of the stabilisation of glow plasma at atmospheric pressure" JOURNAL OF PHYSICS D (APPLIED PHYSICS) UK, vol. 23, no. 8, 1990, pages 1125-1128, XP002322399 ISSN: 0022-3727

**2. Clarity:**

**2.1 Independent claims 1,22** seem not to contain all of the essential features needed to define the invention (cf. the PCT Guidelines, 5.33). In fact, from the wording of **claim 1**, it is not clear how the displacement current can be controlled in order to stabilize the plasma. From the drawings and the description (page 16, l. 1-3), It seems that the inductor of present **claim 9** would bring to the decrease of the displacement current and to the plasma stabilisation. The same applies, *mutatis mutandis*, to the apparatus of **claim 22**.

**3. Novelty and inventive step:**

**3.1 Document D1** discloses (the references in parentheses applying to this document) the generation of an atmospheric pressure glow plasma in a discharge space comprising one or more electrodes (page 2, section 4, lines 1-2), wherein said plasma is generated by applying an alternating voltage to said electrodes (page 2, section 4, lines 3-6) and wherein the displacement current is measured by a capacitor (page 2, section 4, lines 10-12).

The subject-matter of independent **claim 1** differs from D1 in that D1 does not disclose:

2005/06/11 14:44:40 00010

- a) the use of said apparatus for a method of removing contaminants from a surface of a substrate;
- b) that the plasma is stabilised by controlling the displacement current.

**3.1.1** The subject-matter of **claim 1** is therefore novel (Article 33(2) PCT)

The problem to be solved by the present invention may be regarded as: how to achieve a plasma with homogeneous properties (cf. the present application, p. 3, I.13-18).

**3.1.2** No one of the prior art documents suggests to control the displacement current for stabilising the plasma, therefore the solution to the above problem proposed in **claim 1** of the present application is considered as involving an inventive step (Article 33(3) PCT).

**3.2** The other document cited in the Search Report are less relevant than D1. Document **D2** relates to a study on the displacement current for dielectric barrier discharges, when the discharge is in form of atmospheric glow discharge. An increase of the discharge by increasing the pulse voltage current is limited by the displacement current (p.3, section 4). **D3, D4** relate to the stabilisation of an atmospheric pressure glow plasma, but they do not refer to the control of the displacement current.

**3.3** Independent **claim 22** relates to an apparatus for removing contaminants from a surface which comprises means for controlling the displacement current during plasma generation. The subject-matter of claim 22 is novel and inventive for the same reasoning as explained under point 3.1 above.

**3.4** Dependent **claims 2-21, 23-29** also meet the requirements of the PCT with respect to novelty and inventive step.

#### **4. Miscellaneous:**

**4.1** The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

**4.2** Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 is not mentioned in the description, nor is this document

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AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/NL2004/000897

identified therein.

2005/04/11 14:44:43 00012